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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,279	07/29/2003	Lloyd Mahlon Robeson	06359 USA	9701
23543      7590      05/14/2007 AIR PRODUCTS AND CHEMICALS, INC. PATENT DEPARTMENT 7201 HAMILTON BOULEVARD ALLENTOWN, PA 181951501			EXAMINER FICK, ANTHONY D	
			ART UNIT 1753	PAPER NUMBER
			MAIL DATE 05/14/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/630,279	<b>Applicant(s)</b> ROBESON ET AL.	
	<b>Examiner</b> Anthony Fick	<b>Art Unit</b> 1753	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 February 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 11-13, 15-19 and 23-28 is/are rejected.
- 7) ☒ Claim(s) 7-10, 14 and 20-22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/22/07</u> .   | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Remarks***

1. Applicant's amendments have overcome the previous rejections under 35 U.S.C. 112 second paragraph. The rejections are therefore withdrawn.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 12, 13, 26, 27 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claim 12 recites the limitation "The photovoltaic device" in line 1. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 13 recites the limitation "The photovoltaic device" in line 1. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 26 recites the limitation "The device" in line 1. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 27 recites the limitation "amount of photoactive material is sufficient to decrease..." in line 10 and the limitation "amount of polymer is sufficient to reduce crystallization..." in line 11. It is unclear what limitations these present within the claim as the specification does not give any amounts to meet the required outcomes.
8. Claims 12, 13 and 28 all depend from claim 27 and are indefinite for the same reasoning.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1 through 6, 11, 15 through 19, 23 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Naito (U.S. 5,536,588).

Naito discloses an amorphous organic polymer composition for use in various applications. The polymer composition comprises dye molecules mixed in polycarbonate or polyimide to form a single-phase mixture (column 4, paragraph 1).

Regarding claim 1, Naito discloses the T<sub>g</sub> of the mixture is at least 125 °C (column 4, paragraph 1) and is utilized within an organic solar cell element comprising an anode and cathode, a photoactive layer of the single-phase mixture between the electrodes, the photoactive material being a light harvesting organic material, a hole transporting organic material or a charge transporting material, and the layer is in electrical communication with the anode and cathode (column 7, paragraph 4). Naito further discloses the dye molecule content of the mixture is at least 20% by weight (column 6, paragraph 3).

Regarding claims 2 and 3, Naito further discloses utilizing a transparent substrate, glass, next to a transparent anode, ITO electrode (column 7, paragraph 3).

Regarding claims 4, 5 and 6, Naito discloses the polymer is amorphous and not conductive, has a glass transition above 150 and is a polycarbonate or polyimide (column 4, paragraph 1).

Regarding claim 11, Naito discloses a mixture of dye at least 50% by weight (column 6, paragraph 3).

Regarding claims 15 through 19, Naito discloses several structures for the photovoltaic device including a two-layer structure or a three-layer structure with electron transporting layers, hole transporting layers and light harvesting layers (column 7, paragraph 5).

Regarding claim 23, Naito discloses a method of producing the photovoltaic device by providing the electrodes and the photoactive layer as stated above.

Regarding claim 25, Naito discloses providing a transparent substrate on the side of the anode (column 7, paragraph 3).

11. Claims 23 through 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiratsuchi et al. (U.S. 6,084,176).

Shiratsuchi discloses a solar cell utilizing an organic hole transporting agent layer. As shown in figure 1, the solar cell comprises an anode, a cathode and a photoactive layer between the electrodes.

Regarding claim 23, a method of manufacturing a solar cell is disclosed by providing an anode, a cathode and the photoactive layer between the electrodes in electrical communication with electrodes.

Regarding claim 24, Shiratsuchi discloses manufacturing the photoactive layer by spin coating (column 29, paragraph 4).

Regarding claim 25, figure 1 also shows a transparent substrate on the side of the anode.

12. Claims 12, 13, 27 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Robeson et al. (U.S. 6,818,919).

Robeson discloses a light-emitting device comprising a high Tg polymer.

Regarding claim 27, Robeson discloses the device comprises an anode, a cathode and a photoactive layer (column 8, paragraph 4). Robeson further discloses the photoactive layer comprises an amorphous polymer, a photoactive material including a hole transport material and an electron transport material, the polymer and photoactive material are in a single phase and in electrical communication with the anode and cathode (column 9, paragraph 6). The polymer is disclosed to have a Tg of at least 200° C and in amounts corresponding to the requirements of the claim (reduces glass transition of the polymer, reduce crystallization of the photoactive material) (column 4, paragraphs 8 and 9).

Regarding claim 28, Robeson discloses the same poly(arylene ether) polymer (column 5, paragraphs 1 and 2).

Regarding claims 12 and 13, Robeson discloses several materials for hole and electron transporting materials (column 7 line 50 to column 8 line 53).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

***Allowable Subject Matter***

13. Claims 7 through 10, 14 and 20 through 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter: the polymers required by claims 7 through 10 are known in the prior art to be utilized as protective layers for semiconductor devices (Burgoyne Jr. U.S. 6,060,170) or within LED devices (Robeson et al. U.S. 6,818,919). However, there is no teaching within the prior art of use of the polymers with light harvesting organic materials within a photovoltaic device. The remaining claims require specific light harvesting organic materials that have low glass transition temperatures. The reference to Naito requires the organic molecules that mix with the polymer to possess high transition temperatures and therefore it would not be obvious to utilize such materials within the device of Naito. Thus the claims contain allowable subject matter.

***Response to Arguments***

15. Applicant's arguments filed February 26, 2007 have been fully considered but they are not persuasive. Applicant's argue that the reference to Naito cannot anticipate each and every aspect of the claimed invention because Naito uses dye molecules with a relatively high glass transition temperature while the instant invention permits using materials with relatively low glass transition temperatures. The examiner respectfully disagrees. The applicant has not pointed out how these differences between the Naito reference and the instant invention are described within the claims. Applicant is arguing subject matter that is not within the rejected claims. As stated above, the reference to Naito contains all the structural elements of the claims and utilizes polymers listed by applicant within claim 6. Therefore the rejections of Naito are maintained. Applicant further argues the reference to Shiratsuchi does not disclose each and every aspect of the claimed invention. With regards to claim 1, the examiner agrees that the amendment has overcome the reference. With regards to the method claims, 23-25, the examiner respectfully disagrees. While the claim preamble references the device of claim 1, the method steps make no reference to the specific device of claim 1. The reference to Shiratsuchi discloses each step of the method; providing an anode, cathode and at least one photoactive layer in electrical communication with the anode and cathode. The claim does not require this photoactive layer to be the same as within claim 1 and therefore Shiratsuchi contains every single step in the method and the rejection is maintained.



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16. Applicant's arguments, see page 9 or remarks, filed February 26, 2007, with respect to claims 7 through 10 and 14 have been fully considered and are persuasive. The rejections under 35 U.S.C. 103(a) of claims 7 through 10 and 14 have been withdrawn.

17. Applicant's arguments with respect to claim 13 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday - Friday 7 AM to 4 PM.

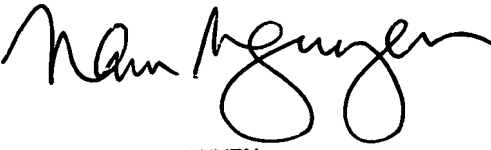
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick  
AU 1753  
May 10, 2007

ADF

  
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